Are Japanese Junior High School Teachers Ready for One-To-One Devices in Schools? A Case Study

Steven Lim
Meikai University

In response to the COVID-19 pandemic, the implementation of the GIGA School Program, a policy to provide one computer or tablet to each student in compulsory education (MEXT, 2020), was brought forward from its original 2023 deadline to March 2021. This accelerated implementation has led to concerns as to the readiness of in-service teachers to integrate one-to-one device usage into their pedagogy. In order to examine these concerns, a mixed methods study was conducted using a questionnaire and interviews to determine the attitudes of eight Japanese public junior high school English teachers towards the incorporation of the technology in their classes, and their preconceptions regarding the usefulness and ease of use of the devices. The results indicate that teachers believe the technology could prove beneficial for their teaching but have yet to receive sufficient training in how to effectively utilize it.

COVID-19の影響を受け、文部科学省は義務教育において児童生徒がコンピュータやタブレット等の端末を1人1台使用するGIGAスクール構想の実現目標を当初の2023年度から2021年3月へ前倒しすると表明した(MEXT, 2020)。この実現時期の前倒しは、コンピュータ端末の活用また指導法に対する教員のレディネスに関して懸念をもたらしている。本研究は公立中学勤務の英語教師 (n = 8) を対象とし、リッカート尺度を用いたアンケート調査及びインタビュー調査を組み合わせた混合型研究法を採用することで、教育現場におけるコンピュータ端末の有用性及び活用の難易度に対する教員評価を検証した。本研究の結果、教員は教育現場に及ぼすGIGAスクール構想の好影響を評価する一方で、活用に向けた十分な研修機会が与えられていないことが示唆された。

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Japan's failure to integrate technology in the education system was exposed when, from March to June 2020, schools were closed across the country due to the COVID-19 pandemic. According to Sato (2020), in this period almost no online lessons were conducted in public schools. Though some schools had the necessary infrastructure to conduct online classes, they chose not to do so. As of 2018, Japan ranked last among the 38 member countries in the use of information and communications technology (ICT) for learning (Horita, 2021). Just 3% of Japanese students used PCs to do homework every day or almost every day compared to the Organisation for Economic Co-operation and Development (OECD) average of 22.2%, and 6% used websites for schoolwork compared to the OECD average of 23%. In contrast, 87.4% of Japanese students chatted online and 47.7% played single-player video games every day or almost every day, compared to the OECD averages of 67.3% and 26.7% respectively. These statistics indicated that Japanese students were comfortable using technology in their leisure time but did not incorporate it in their academic pursuits.

The implementation of the Global and Innovation Gateway for All (GIGA) School Program, a policy to provide one computer or tablet to each student in compulsory education (MEXT, 2020), was accelerated from its original 2023 deadline to the end of March 2021 to ensure distance learning could be conducted during the pandemic (Sato, 2020). The Ministry of Education, Culture, Sports, Science and Technology (MEXT) also laid out ambitious goals as to the changes in pedagogy that it expected to be brought about by each student having access to a device. Examples of learning made possible by a one-to-one program included teachers being able to adapt their interactive lessons based on students' reactions, individualized learning adjusted to the needs of each student by recording study logs for analysis, and students being able to collect information independently but edit collaboratively (MEXT, 2020). Teachers were being asked to not only become proficient in conducting distance learning, but also to overhaul their existing teaching practices to incorporate the capabilities of the new technology.

Given the abrupt acceleration of the GIGA School Program, there are concerns from teachers in compulsory education as to the extent to which they are prepared to integrate technology into their lessons (Kang, 2021). Whether teachers are willing to accept and adopt these technology-based pedagogies depends on their attitudes regarding the implementation of technology in the classroom, the training they receive, their understanding of the affordances the technology can provide, and the support systems put in place.

The purpose of this study was to examine the

attitudes of junior high school English teachers towards one-to-one devices. At the time of the study, the participants had yet to experience any significant time using the devices. As such their perceptions as to the usefulness and ease of use of the devices, as well as their attitudes regarding the use of technology in the classroom, were based on their preconceptions rather than experience.

Research Questions

This study is guided by the following research questions:

1. How useful do junior high school English teachers perceive one-to-one devices to be?
2. How easy to use do junior high school English teachers perceive one-to-one devices to be?
3. What are the attitudes of junior high school English teachers about teaching with one-to-one devices?
4. How prepared do junior high school English teachers feel they are to teach using one-to-one devices?

Method

This was a mixed methods study which used a Likert-scale questionnaire and semi-structured interviews. The participants were eight Japanese English teachers who worked in public junior high schools in the Kanto region and whose teaching experience ranged from three to more than 30 years. The participants were current or former colleagues of mine. The participants gave their informed consent to take part in the study and were made aware that they could withdraw from this study at any point.

The questionnaires were submitted anonymously, and the interviewees are referred to by pseudonyms. The questionnaire and interviews were conducted in English, the L2 of the participants, but they were given the option to write or speak in Japanese. The questionnaire and interview questions were piloted and design changes were made based on the results. The questionnaire was constructed using Google Forms and sent to the participants in June 2021. Teachers answered 28 Likert-scale questions regarding how prepared they felt to teach using the devices, and to address the constructs of usefulness, ease of use, and attitude, not only from their own perspective, but also from their students' perspective. All Likert-scale questions required participants to choose a response to a positive statement (e.g., *Using Chromebooks/tablets will improve my teaching*) on a five-point scale from *Strongly Disagree* to *Strongly Agree*.

Some questions were adapted from ones used by Davis (1989) in the technology acceptance model (TAM). Originally devised for application in a business context, Liu et al. (2017) reported that the TAM had been tested in many educational studies and was seen as an effective predictor of teachers' intention to integrate technology into their pedagogy. Other questions were informed by a review of the literature and the pilot study.

Semi-structured interviews with five of the participants, one male and four female, were carried out later in the month. Two participants were interviewed in person and three using an online video conferencing service. Descriptive statistics were calculated using JASP (JASP Team; Version 0.14.1). The interviews were recorded, transcribed, and coded in relation to the four constructs of usefulness, ease of use, attitude, and preparedness.

Results

Table 1 shows the results of the five-point Likert scale questionnaire. Each of the acceptance factors was examined using paraphrased and verbatim responses from the semi-structured interviews.

Table 1

Participants' Perceptions of Acceptance Factors for Teachers and Students

Acceptance Factors	For Teachers *M*	For Students *M*	Combined *M*
Usefulness	4.28	4.09	4.19
Ease of Use	3.41	3.41	3.41
Attitude	4.13	4.34	4.23
Preparedness	2.00		

Note. $N = 8$

Usefulness

In response to Research Question 1, *How useful do junior high school English teachers perceive one-to-one devices to be for themselves and their students?*, the qualitative results support the 4.19 combined usefulness factor score in that all the participants agreed that the devices would be useful for both themselves and their students. The three themes related to usefulness that emerged from the interviews were: affordances, autonomy, and efficiency.

The teachers discussed how the devices would enable the students to take advantage of affordances

that would be unavailable to them otherwise. Several teachers mentioned that the Chromebooks had speech recognition software that would allow the students to practice speaking, whether by interacting with virtual assistants or using AI to evaluate their speaking ability. One teacher mentioned the ability to screen share as being beneficial to those students with poor eyesight or positioned at the back of the classroom who might struggle to clearly see PowerPoint displays.

The participants also noted the opportunities for autonomous learning that the devices would provide for the students. Rather than being limited to the textbook, teachers mentioned how students would be able to access information in English from news websites and social media services, as well as being able to research topics they were interested in for reports and presentations. One teacher suggested that students would be empowered by being able to look up grammar or vocabulary they did not understand.

The improvements to efficiency in teaching and administration work that technology would bring was also a recurring theme in the responses. There was the perception that once teachers became familiar with using ICT, it would shorten their lesson preparation time and allow them to collect work and distribute grades quickly and easily. More efficient marking and feedback were mentioned by several participants who noted that the spelling and grammar checking functions of the devices could save them considerable time and effort.

Ease of use

In response to Research Question 2, *How easy to use do junior high school English teachers perceive one-to-one devices to be for themselves and their students?*, despite the 3.41 score indicating that the teachers had a moderately positive response to the ease of use of the devices the comments made in the semi-structured interviews were predominantly negative. The three themes related to ease of use that emerged from the interviews were: time-consuming, technical issues, and insufficient computer skills.

Every teacher referred to how time-consuming preparing lessons using one-to-one devices would be, at least initially. There was also concern as to time-management issues arising from the introduction of a new medium of study with several teachers questioning whether they had sufficient lesson time to make use of the technology.

None of the teachers saw themselves as computer experts and as such they raised concerns over potential technical issues. Two were worried they would be held responsible if the devices broke. Networking issues were also seen as problematic. In the area the participants worked in, there were problems with setting up Wi-Fi in the schools. As a result, the junior high schools could only use the Internet three days a week, one day for each grade, and the elementary schools were apportioned the remaining two days. In addition, one teacher described how getting the students to log into the network and set up their password took 30–40 minutes due to the poor internet connection.

Results from analyzing the interview data show that many teachers believe they lack the necessary computer skills to use them effectively in the classroom, worry about damaging the devices, and are concerned about the students' abilities to operate these computers. One teacher raised the issue that students had little experience using computers to study and that many were not comfortable typing in Japanese, let alone English.

Attitude

In response to Research Question 3, *What are the attitudes of junior high school English teachers regarding one-to-one devices and what do they perceive the attitudes of their students to be?*, the 4.34 for student attitude indicates that the teachers believed their students would have positive attitudes towards using the devices, and this was reflected in the interviews. The three themes related to attitude that emerged from the interviews were: interaction, entertainment, and novelty.

The medium of interaction was a reason given by teachers as to why students would respond well to the devices with several participants suggesting that students were intrinsically more interested in screens than paper, citing their extensive use of smartphones. The effortless nature of interacting with a screen compared to using a pen and paper was also a recurring theme. There was a belief by some of the teachers that unmotivated students would be more likely to participate since selecting an answer with a touchscreen required less effort than writing a response.

The use of computers as a bridge between education and entertainment was alluded to by the participants through mentions of quizzes, movies, TV shows, and the inherent game-like qualities of using a device. Teachers also spoke about how students would have greater opportunities to explore their creativity whilst learning by making animations, filming skits or dramas, and editing videos using the computers.

The novelty of having a new way to engage with English was also suggested as being sufficient to generate enthusiasm from the students. The only concern raised regarding student attitudes was that the Chromebooks might prove to be too popular. One participant was worried students might spend too much time on their computers and would respond negatively to classroom activities that did not involve the devices.

Preparedness

In response to Research Question 4, *How prepared do junior high school English teachers feel to teach using one-to-one devices?*, the preparedness score of 2.00 in the Likert-scale questionnaire was supported by the negative responses regarding this factor in the interviews. The two themes related to preparedness that emerged from the interviews were: limited training and limited hands-on experience.

The interviewees expressed concern and frustration about the lack of instruction they had received, and their unpreparedness to teach using the Chromebooks. Of the five interviewees, two had received some form of training, but for both it had been conducted over a year ago and was a single, two-hour session. Only one of the participants was aware of an upcoming training session.

In terms of hands-on time with the devices they would be using in their respective schools, all the participants had logged in to make an account, but because they had not been allowed to access the computers subsequently, that was the extent of their experience.

Discussion

The participants were optimistic about the usefulness of the devices and held positive attitudes towards their integration in the classroom. The themes of affordances, autonomy, efficiency, interaction, entertainment, and novelty highlight the potential benefits the teachers felt a technology-facilitated pedagogy could provide for both themselves and their students. However, the participants raised concerns about the ease of use of the devices as well as their own preparedness to utilize them in lessons. The themes of time-consuming, technical issues, insufficient computer skills, limited training, and limited hands-on experience which emerged from the interviews suggest that the teachers had not received the instruction and support to make them confident about utilizing the computers in their classes.

In a case study examining the implementation of Chromebooks in an American high school, Saltmarsh (2021) found that three factors were key to the successful adoption of a one-to-one device program: independent research, collaboration, and support systems.

The teachers in Saltmarsh's (2021) study referred to the importance of self-learning through trial and error and using online resources as a means of independent research. One of the participants in this study echoed the notion, suggesting that teachers needed to take the learning process into their own hands, "Every teacher is like, let's just try and touch it and figure out how to use it. The fastest way is maybe just google how to use it." However, the take-home policies varied from school to school, so whilst some teachers were informed that they would be able to bring their computers home over the summer holiday, others were not permitted to do so. Considering that one fundamental motivation for the acceleration of the GIGA School Program was to enable distance learning in response to the pandemic, not allowing teachers and students to take the devices home for security reasons seems counter-productive.

Teachers can foster an environment of collaborative learning through sharing their self-learning experiences, allowing the group to develop their knowledge collectively. All of the participants made reference to one teacher from their school being sent to a one-to-one device training session, then being responsible for disseminating this information amongst their coworkers. One of the interviewees had been asked to take on the role of a technology mentor for her school, despite having only received 2–3 hours of training over a year ago. Whilst the strategy of teachers teaching teachers is not problematic in and of itself, they should not be expected to do so without having received a significant amount of training themselves. Koehler and Mishra (2009) observed that when teachers are given technology training that is not specific to their discipline it reduces their perception of its usefulness. Rather than expecting one person to provide training to teachers of all disciplines, having one representative from each department would allow more specific demonstrations regarding the value of the technology to the teaching of the subject. Training is most valuable when it is focused on how to fuse technology and curriculum rather than the teaching of isolated technology skills (Zhao & Bryant, 2006).

Having technical support systems in place to assist the teachers in case the devices break is also a

necessity. Although MEXT set aside 10.5 billion yen to support the placement of ICT engineers (MEXT, 2020), none of the participants in the study mentioned one being assigned to their school. This lack of an expert presence undoubtedly contributed to the unease of some of the participants as to who would be responsible if the computers were damaged. By having a designated expert available for the teachers to consult and call upon when technical issues occurred, teachers would be more willing to make use of the devices.

Human resource support systems also need to be put into place to allow all teachers to attend training sessions during work hours. Sato and Kleinsasser (2004) have noted that teachers in Japan were often too busy to attend teacher training sessions and that there were limited opportunities provided to do so. Indeed, one participant said that he would only be able to attend a training session if he was exempted from supervising his school club. All of the interviewees mentioned that the only feasible time for training sessions to be held was in the summer break, thus limiting their effectiveness in addressing the immediate needs of the teachers throughout the year.

The positive reaction from the teachers regarding their intention to adopt the technology is nothing short of remarkable given their limited preparation time, lack of training, and the technical issues they continue to face. This lack of preparedness is a consequence of the rush to introduce technology into Japanese schools in response to the pandemic after years of neglect of ICT in the education system. By pushing the GIGA School Program forward two years from its original date, MEXT has attempted to address the historically poor integration of ICT with education in Japan. However, such a rapid change has resulted in deficiencies. Not only are there severe infrastructure issues that limit the use of the technology, the teachers responsible for using it in their classrooms have not received the information, training, and resources they need to implement the program.

Conclusion

The purpose of this study was to examine the perceptions of Japanese junior high school English teachers regarding the impending implementation of a one-to-one device program in Japan. There were several limitations to this study. Because there were few participants and they all worked in one area, the findings cannot be generalized beyond those who took part in the study. Instead, this study should serve as the starting point from which to examine how successful the GIGA School Program ultimately proves to be. Further studies need to take place to determine how teachers are able to effectively integrate the one-to-one devices into their pedagogy so that they may serve as models for other educators in the Japanese public school system. There also needs to be an examination of the potential drawbacks of the use of one-to-one devices so that these issues can be addressed collectively. Both issues should be addressed from the perspective of teachers and students in order to get a more complete picture as to which practices are most effective. Such studies can contribute to the collaborative learning process that is currently ongoing throughout the country.

Due to the circumstances surrounding the hastened introduction of the GIGA School Program, this study represents a unique point at which to inspect a national education technology integration program. The participants were asked for their opinions regarding the usefulness, ease of use, and attitudes of themselves and their students, as well as the extent with which they were prepared to integrate technology in their teaching practices. Teacher attitudes are critical in determining how successful the integration of technology in the classroom will be (Teo et al., 2009). The teachers in this study were positive about the potential for ICT to improve their teaching, facilitate new methods of learning for students, and to streamline aspects of feedback and administration, but expressed strong concerns over their own lack of preparedness.

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Steven Lim has been teaching at various positions in Japan since 2005 and is currently working as an assistant professor at Meikai University. He graduated from Temple University, Japan Campus with an M.S.Ed in TESOL. His research interests include teacher beliefs and practices, speech modification, and the use of technology in education.

Appendices

Appendix A

Likert Scale Questions Categorized by Acceptance Factor

Perceived teacher usefulness

1. Using Chromebooks/tablets will improve my teaching.
8. Using Chromebooks/tablets will enhance my effectiveness as a teacher.
15. Using Chromebooks/tablets will allow me to use new teaching methods.
22. Using Chromebooks/tablets will be useful in my classes.

Perceived students' usefulness

4. Using Chromebooks/tablets will allow my students to study English in new ways.
11. Studying English be more effective for my students using Chromebooks/tablets.
18. Using Chromebooks/tablets will improve my students' English.
25. Using Chromebooks/tablets will be useful for my students to study English.

Perceived teacher ease of use

2. It will be easy for me to use my Chromebook/tablet in lessons.
9. It will be easy for me to learn how to use Chromebooks/tablets in my lessons.
16. It will be easy for me to improve my skill at using Chromebooks/tablets.
23. It will be easy to include the use of Chromebooks/tablets in my lessons.

Perceived students' ease of use

5. It will be easy for the students to use Chromebooks/tablets.
12. It will be easy for the students to learn how to use Chromebooks/tablets.
19. It will be easy for students to improve their skill at using Chromebooks/tablets.
26. Using Chromebooks/tablets in classes will be a smooth experience.

Teacher attitude towards Chromebooks

3. Chromebooks/tablets will make teaching more interesting.

10. I'm looking forward to using Chromebooks/tablets in my classes.
17. I like using computers to teach.
24. It's fun for me to use technology in my classes.

Perceived students' attitude towards Chromebooks

6. Chromebooks/tablets will make studying English more interesting for my students.
13. My students are looking forward to using Chromebooks/tablets to study English.
20. My students like using computers to study.
27. It's fun for my students to use technology to study English.

Teacher preparedness

7. I have received enough training in how to use Chromebooks/tablets in an English lesson.
14. I am now ready to teach English using Chromebooks/tablets.
21. I know what activities to do with my students using Chromebooks/tablets.
28. I have watched enough demonstrations of how to use Chromebooks/tablets in an English class.

Appendix B

Open-Ended Questions

1. Are you excited to use Chromebooks/tablets in the classroom? Why or why not?
2. How do you think using Chromebooks/tablets will change your teaching?
3. Have you had training on how to use Chromebooks/tablets with students in the classroom? Tell me about it.
4. Are you ready to use Chromebooks/tablets in your classes? Why or why not?
5. How often are you planning to use Chromebooks/tablets?
6. What parts of teaching English will be better using Chromebooks/tablets? For example, listening, reading, writing, speaking, grammar, vocabulary.
7. How will you use Chromebooks/tablets with your students? For example, quizzes, surveys, research, filming video, recording audio, watching videos, listening to audio.
8. What software, apps, or websites are you planning to use?
9. Do you want your students to use the Chromebooks/tablets at school, at home, or both?
10. Do you have any worries about your students using Chromebooks/tablets? If yes, what are they?
11. Are Chromebooks/tablets helpful for your teaching style? Why or why not?